

97-84052-5

Industrial Commission of
Ohio.

Standards for safety and
sanitation relating to...

Columbus

1916

97-84052-5

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Z	Ohio. Industrial commission. Dept. of workshops
Box 138	and factories.
	... Standards for safety and sanitation relating to foundries and the employment of women in core rooms, adopted by the Industrial commission of Ohio and recommended to employers as standards of safety and sanitation...Columbus, Meer, 1916.
	12 p. 24 cm.
	At head of title: The Industrial commission of Ohio. Department of workshops and factories.
91855	
	ONLY ED

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TECHNICAL MICROFORM DATAFILM SIZE: 35mmREDUCTION RATIO: 11:1IMAGE PLACEMENT: IA (11A) IB IIBDATE FILMED: 3-25-97INITIALS: FBTRACKING #: 22785

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Legislation
Columbus, Ohio, 1914

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THE INDUSTRIAL COMMISSION OF OHIO

DEPARTMENT OF
WORKSHOPS AND FACTORIES

Standards for Safety and Sanitation Relating to Foundries and the Employment of Women in Core Rooms



MEMBERS OF THE INDUSTRIAL COMMISSION OF OHIO

WALLACE D. YAPLE, *Chairman*
Chillicothe

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Chief Factory Inspector

VICTOR T. NOONAN,
Safety Director

THE INDUSTRIAL COMMISSION
OF OHIO

DEPARTMENT OF
WORKSHOPS AND FACTORIES

Standards for Safety and Sanitation
Relating to Foundries and the
Employment of Women
in Core Rooms

Adopted by the Industrial Commission
of Ohio and Recommended to
Employers as Standards of
Safety and Sanitation



COLUMBUS, OHIO:
THE F. J. HEER PRINTING CO.
1916

Bound at the State Bindery.

GENERAL SAFETY ADVISORY COMMITTEE.

Mr. S. P. Bush..President, The Buckeye Steel Castings Company, Columbus, Ohio
 Mr. R. H. Jeffrey.....The Jeffrey Manufacturing Company, Columbus, Ohio
 Mr. D. R. Kennedy.....Youngstown Sheet & Tube Company, Youngstown, Ohio
 Mr. F. M. Baggs.....Portsmouth, Ohio
 Mr. Malcolm Jennings..Sec'y of the Ohio Manufacturers' Ass'n, Columbus, Ohio
 Mr. L. H. Burnett.....Carnegie Steel Company, Pittsburgh, Pa.
 Mr. Samuel G. McMeen..President, Columbus Railway, P. & L. Co., Columbus, Ohio
 Mr. W. E. Wells.....East Liverpool, Ohio
 Mr. John Voll.....President, Ohio Federation of Labor
 Mr. Victor T. Noonan.....Director of Safety, Industrial Commission, Secretary

This general advisory committee by unanimous vote recommends that this report of the sub-committee on foundries be recommended to The Industrial Commission of Ohio for enforcement on and after January 1, 1916, unless later action is taken by the advisory committee, and that in the meantime, these rules be printed and sent out to the foundries and to others interested, with the statement that these rules have been adopted by the advisory committee and recommended to The Industrial Commission of Ohio.

COMMITTEE ON FOUNDRIES.

Mr. H. J. Boggis, Chairman.....The Taylor & Boggis Fdy. Co., Cleveland, Ohio
 Mr. Thomas D. West...West Steel Castings Co., Cleveland, Ohio (since deceased)
 Mr. J. M. Woltz.....Youngstown Sheet and Tube Co., Youngstown, Ohio
 Mr. John R. O'Leary.....Int. Moulders' Union N. A., Box 669, Cincinnati, Ohio
 Mr. John O'Neil.....Gray Iron, 446 W. First Ave., Columbus, Ohio
 Mr. Fred L. Baumgartner.....505 Superior Bldg., Cleveland, Ohio
 Mr. D. J. Ryan.....Pres., Allyne-Ryan Foundry Company, Cleveland, Ohio
 Mr. Timothy Rowan.....Labor, 939 Central Avenue, Hamilton, Ohio
 Mr. George A. Pickup.....Gen. Supt., Woehrl Stove Company, Newark, Ohio

RESOLUTION.

Be it resolved, by The Industrial Commission of Ohio, that Standards for Safety and Sanitation Relating to Foundries and the Employment of Women in Core Rooms be and the same is hereby authorized to be published, and that copies of the same be ordered printed.

Adopted July 18, 1916.

THE INDUSTRIAL COMMISSION OF OHIO,

WALLACE D. YAPLE,
Chairman.

Attest:

GEO. L. STOUGHTON,
Secretary.

RESOLUTION.

Be it resolved, That the recommendations of the Advisory Committee upon Safety and Sanitation regulation of Foundries and the Employment of Women in Core Rooms shall be accepted by The Industrial Commission of Ohio as standards for inspection; that inspectors shall be instructed to report any divergence from such standard in such foundries and core rooms, and that such divergence shall be remedied upon orders of the Commission; and that such orders shall have the force and effect of law.

That the employers operating such foundries and core rooms and operations shall be requested to bring their plants and operations into accord with said standards in advance of said inspection.

Adopted June 30, 1916.

THE INDUSTRIAL COMMISSION OF OHIO,

WALLACE D. YAPLE,
Chairman.

Attest:

GEO. L. STOUGHTON,
Secretary.

I. DEFINITIONS FOR IRON AND STEEL FOUNDRIES.

RULE 1. An iron or steel foundry shall mean a place where iron or steel or both metals are melted and poured into sand molds in the making of castings, together with all cleaning, coremaking, drying, wash rooms and toilet rooms used in connection therewith.

RULE 2. The term "entrance", as used in these rules, shall mean main doorways opening directly to the outer air.

The term "gangway" as used in these rules shall mean well-defined passageways dividing the working floors of foundries but not the spaces between molds. Spaces between molds shall be divided into three classes, which shall be known as "bull-ladle aisles", "hand-ladle aisles" and "buggy-ladle aisles".

RULE 3. Except as otherwise specified, these rules shall, as to the subjects covered herein, exempt foundries from the general rules relating to such subjects.

II. ENTRANCES.

RULE 4. Entrances to foundries shall be protected from November first to April first of each year by a covered vestibule, either stationary or movable, which shall be so constructed as to eliminate drafts and of such dimensions as to answer ordinary purposes, such as the passage of wheel-barrows, trucks and small industrial cars. This shall not apply to entrances used for railroad or industrial cars handled by locomotives or motors, or for traveling cranes, horse-drawn vehicles or automobiles; these entrances may remain open only for such time as is necessary for the ingress and egress of such cars, trucks and cranes, horse-drawn vehicles or automobiles.

No locomotive shall be permitted to remain inside the foundry during the loading or unloading of the cars.

III. GANGWAYS.

RULE 5. Main gangways where metal is carried by hand, bull or truck ladles shall be not less than five feet wide. Truck-ladle gangways which are not main gangways shall be not less than four feet wide. Bull-ladle aisles between floors shall be not less than three feet wide. Single hand-ladle or buggy-ladle aisles between floors shall be not less than eighteen inches wide. Where trolleys are used over molding floors for pouring metal, the aisles shall be of sufficient width to permit the safe ingress and egress of employees and the safe use of the ladles. Where it is necessary to occupy the central portion of the floor space in the production of moldings, continuous gangway space shall be provided.

RULE 6. During the progress of casting every gangway or aisle shall be kept entirely free from pools of water or obstructions of any nature. Every gangway where industrial tracks are used shall be constructed of a hard material of substantial character and the top of the rails shall be flush with the floor. Every gangway shall be kept in good condition at all times.

IV. REMOVAL OF SMOKE, STEAM, GASES AND DUST.

RULE 7. Where smoke, steam, gases or dust arising from any of the operations of the foundry are dangerous to health or eyes, and where a natural circulation of air does not carry off such smoke, steam, gases or dust, there shall be installed and operated hoods, ventilators, fans or other mechanical means of ventilation approved by the Industrial Commission of Ohio.

RULE 8. The cleaning and chipping of castings shall be done in cleaning rooms except that where traveling cranes or where, in existing installations, cars are used for conveying castings into such rooms, a separating partition shall be erected which shall be not less than twelve (12) feet in height. In existing installations, where the crane cage or crane girders will not permit the erection of a twelve-foot partition, the height of the partition may be reduced sufficiently to permit the clearance of same. Large castings may be chipped or cleaned by hand in the molding room or where cast provided sufficient protection is furnished by the use of a curtain or screen or some other means equally good to protect employees who are otherwise employed therein.

This rule shall not apply if mechanical contrivances are used for cleaning castings and the dust and particles arising therefrom are effectively removed satisfactorily to The Industrial Commission of Ohio.

RULE 9. Where tumbler mills are used, exhaust systems shall be installed to effectively carry off the dust arising from the cleaning of castings, except where the mill is operated outside the foundry. This does not prohibit the use of a water barrel for the purpose of cleaning castings. Sand blast operations shall be carried on in the open air or in a separate room used solely for that purpose. The milling of cupola cinders, when done inside the foundry, shall be carried on by an exhaust-mill or water-mill, each of a form approved by The Industrial Commission of Ohio.

RULE 10. No cores shall be blown out of castings by compressed air unless such work is done outside the foundry or in a special or dust-proof enclosure approved by the Industrial Commission of Ohio.

Men employed in cleaning castings by compressed air or sand blast shall wear eye guards and helmets; such helmets shall be of such design as to meet the approval of the Industrial Commission of Ohio.

RULE 11. Where fumes, gases and smoke are emitted from drying ovens in such quantities as to be detrimental to the health or eyes of the employees, hoods and pipes or exhaust fans or other mechanical means shall be provided over the doors of such ovens. Hoods and pipes will not be required where they would interfere with the operations of traveling cranes, but other effective means shall be provided for the removal of such fumes, gases and smoke.

V. LIGHTING AND HEATING.

RULE 12. Where natural light is insufficient properly to light the foundry, artificial light of sufficient power shall be provided, in the discretion of The Industrial Commission of Ohio.

The continuous use of hand torches or other lamps that emit injurious smoke or gases is prohibited.

RULE 13. Interior walls of foundries shall be whitened, in the discretion of The Industrial Commission of Ohio.

RULE 14. Proper and sufficient heat shall be provided and maintained in every foundry. The use of the open Salamander stove, or stoves of that type, when used for heating purposes shall be prohibited. Open fires may be used for the purpose of drying molds or cores, if coke containing less than 1% of sulphur be used.

RULE 15. All hand and bull-ladles shall be dried outside the foundry; or in accordance with Rule 7.

A sufficient number of sheet iron shields shall be available in foundries for use in covering hand and bull-ladles.

VI. SANITARY CONVENIENCES.

RULE 16. Suitable facilities shall be provided for drying the clothing of such employees as may be found necessary at the discretion of The Industrial Commission of Ohio, and may be located in the wash room, the locker room, or in a room used exclusively for that purpose.

RULE 17. In every foundry where water closets or privy accommodations are permitted by The Industrial Commission of Ohio to remain outside of the foundry, the passageway leading from the foundry to the said water closets or privy accommodations shall be so constructed that the employees in passing thereto or therefrom shall not be exposed to outdoor atmosphere, and such passageways, water closets and privy accommodations shall be properly heated during cold weather.

WATER CLOSETS.

RULE 18. Water closets shall be provided in every foundry and for each sex according to the following table:

Number of Persons.	Number of Closets.	Ratio.
1 to 10	1	(1 for 10)
11 to 25	2	(1 for 12½)
26 to 50	3	(1 for 16½)
51 to 80	4	(1 for 20)
81 to 125	5	(1 for 25)

For every unit of forty-five (45) or fractional part thereof in excess of one hundred and twenty-five (125) persons employed, one additional water closet shall be provided.

URINALS.

RULE 19. In every foundry there shall be provided one urinal; where more than thirty (30) and less than eighty (80) males are employed, two urinals shall be provided, and thereafter one additional urinal shall be provided for every eight (80) males employed or fractional part thereof. At least two linear feet of trough or slab urinal shall be considered the equivalent of one urinal.

WASHING FACILITIES AND WASH ROOMS.

RULE 20. Wash basins with faucets for hot and cold water shall be supplied according to the following table:

Number of Persons.	Number of Wash Basins.	Ratio.
1 to 8	1	(1 for 8)
9 to 16	2	(1 for 8)
17 to 30	3	(1 for 10)
31 to 45	4	(1 for 11½)
46 to 65	5	(1 for 13)

For each additional twenty-five (25) employees at least one additional wash basin shall be provided. Twenty inches of sink shall be considered the equivalent of one wash basin.

RULE 21. Washrooms hereafter installed where twenty (20) or more men are employed shall be provided with at least one shower bath with an ample supply of hot and cold water, and for every additional one hundred (100) men one additional shower bath shall be provided.

This rule shall apply to existing foundries at the discretion of The Industrial Commission of Ohio.

RULE 22. Individual lockers, arranged for locking, shall be provided for employees, and shall be placed either in a room used exclusively for that purpose, in the washroom, the drying room, or at convenient places in the molding room. The necessity for individual lockers, number, etc., shall be determined by The Industrial Commission of Ohio.

NOTE: The general sanitary rules of The Industrial Commission of Ohio shall apply in all matters not specifically covered in Rules 16 to 22 inclusive.

VII. MAINTENANCE.

RULE 23. The floor beneath and immediately surrounding the cupola shall slope and drain away from the base of same.

RULE 24. Persons tapping or stopping up cupolas must wear goggles to protect the eyes.

RULE 25. Ladles, shanks, tongs, slings and yokes, skimmers and slag hoes used in the pouring of molten metals shall, prior to their use, be inspected daily as to their safety, by the men preparing and using same, and in addition a regular inspection as to their safety shall be made once a month by a man designated for that purpose.

A monthly inspection shall also be made of the chains and cables on counterweights in connection with drying ovens, and reports of such inspections shall be made on forms prescribed by The Industrial Commission of Ohio, and shall be kept on file for its inspection.

(See Crane Rules for crane chains, etc.)

RULE 26. Trunions on flasks hereafter constructed shall be carefully designed for the loads they are to handle, and constructed with a factor of safety of at least ten (10), including bolts where they are used. The diameter of the button shall be equal to the diameter of the groove plus one and one-half times the diameter of the sling used to handle the flask. Inside corners shall be well filleted and in order to prevent the sling slipping off or riding the button, the radius of the corner between groove and button shall be approximately equal to the radius of the sling used, the remainder of the inside edge of the button to be straight.

RULE 27. All fireways or pits connected with drying ovens, when built in the floor, shall at all times be protected by either a substantial protecting cover or a standard guard rail.

RULE 28. All trap doors shall be guarded when open, either by standard guard rails or watchmen, and all pits shall be properly covered or railed when not in use, and sufficiently guarded at other times. All casting pits must be free from water and abnormal dampness.

RULE 29. All passageways and stairways shall be properly lighted, and inclined runways and stairways, charging decks and platforms shall be guarded with rails conforming to the standards of The Industrial Commission of Ohio.

RULE 30. All ladles pouring from the lip, of 2,000 pounds or over capacity, shall be equipped with a worm-gear device for tilting same.

All crane, truck and trolley pouring ladles shall be so constructed that the center of gravity shall be below the bail, and shall be equipped with a clip to prevent the overturning of same.

RULE 31. The use of high explosives is absolutely prohibited on the foundry premises, unless effective protection is provided.

RULE 32. The breaking of castings by the use of a drop inside the foundry during the general working hours is prohibited.

Where a drop is used for the breaking of castings or scrap outside of the foundry, a permanent shield of heavy planking or other protection shall be provided.

RULE 33. Every employee in every foundry shall use the devices furnished for his protection by his employer, where there is a hazard connected with his employment.

VIII. REGULATIONS FOR COREMAKING ROOMS IN WHICH WOMEN ARE EMPLOYED.

RULE 34. Where rooms in which core ovens are located adjoin rooms where cores are made by females and where the making of cores and the baking of cores are simultaneous operations, the partition between such rooms shall be constructed of concrete, hollow tile, brick, metal, or wood covered with metal, or other materials approved by The Industrial Commission of Ohio, and there shall be in such partition only such openings as are required by the nature of the business.

RULE 35. All openings in partitions between the oven room and the room in which the females are employed shall be vestibuled with either a revolving device or double doors which shall be self-closing, or any other self-closing device equally effective, which shall be approved by The Industrial Commission of Ohio. Such devices shall be kept in such a condition that gases, fumes and smoke shall be effectually trapped.

RULE 36. No female employed in any coremaking room shall be permitted to handle cores which have a temperature of more than one hundred and ten (110) degrees Fahrenheit.

RULE 37. No female employed in any coremaking room shall be permitted to make or handle cores when the combined weight of core, core box and plate at which she is working shall exceed fifteen (15) pounds.

BRASS FOUNDRIES.

RULE 38. A brass foundry is a place where brass, aluminum, copper, tin, zinc, gold, silver or composition metals containing any of the foregoing metals are melted or poured into sand molds in the making of castings. Foundries where aluminum only is melted shall be covered by the rules governing iron and steel foundries.

The term "cellar" when used in these rules shall mean a room or part of a building which is one-half or more of its height below the level of the curb on the ground adjoining the building (excluding areas.)

The term "basement" when used in these rules shall mean a room or part of a building which is one-half or more of its height above the level of the curb.

RULE 39. The rules relative to dust, smoke, gases, or fumes, ventilation, sanitation, heat, light, gangways and aisles, safety appliances, cleaning rooms, wash rooms, drying and locker accommodations, as specified for iron and steel foundries, shall apply to brass foundries, except that main gangways shall be not less than four (4) feet wide and gangways between molds on spill troughs shall be not less than three (3) feet wide.

Where trolleys are used over molding floors for pouring metal, the aisles shall be of sufficient width to permit the safe ingress and egress of employees and the safe use of the ladles.

RULE 40. When the crown plate of an upright melting furnace is elevated above the surrounding floor in excess of twelve (12) inches, the furnace shall be equipped with a platform with a standard rail; such platform shall be constructed of metal or other fireproof material, and shall extend along the front and sides of the furnace, flush with the crown plate, and shall be at least four feet in width and shall be clear of all obstructions during pouring time. If the platform is elevated above the floor in excess of twelve (12) inches the lowering from same of crucibles containing molten metal shall be done by mechanical means.

Where the combined weight of crucible tongs and molten metal exceeds one hundred (100) pounds, the same shall be removed from furnace and deposited on the floor by mechanical means.

RULE 41. When smoke finish is desired on molds made on benches or tubs, smoke boxes which shall effectually trap the smoke shall be used, such boxes to be connected with flues to the outer air.

RULE 42. Where molders work side by side at least five (5) feet of space sideways shall be allowed for each man, and a clear space of three (3) feet shall be provided back of each man.

RULE 43. Hoods shall be provided directly above all skimming-blocks and brass melting furnaces using gas or oil as fuel, which will effectually trap all gases and fumes generated in the melting of the metal; these hoods shall be provided with outlet pipes to lead the gases and fumes to the outer air.

Ventilators shall be provided over all other furnaces used for melting brass or composition metal, to effectively remove the gases above the furnaces.

RULE 44. Brass foundries shall be provided with natural light from at least two sides or from at least one side and skylights in the roof.

RULE 45. All persons removing pots containing molten metal from furnaces and handling same shall be provided with protection for legs and feet.

RULE 46. Gangway dirt and floor scrapings shall not be riddled in the room where workmen are employed, unless it is so dampened as to prevent dust arising therefrom.

RULE 47. Stoves used for drying molds, when located in the rooms used by workmen, shall be surrounded by a casing of fire-proof material, to the full height of the stove.

RULE 48. No brass foundry shall hereafter be constructed with a clearance of less than fourteen (14) feet between the lowest point of the ceiling and the floor, except that where a peak, saw-tooth, monitor or arch roof is constructed the side walls may be of a minimum height of twelve (12) feet.

PROHIBITION OF FUTURE CELLAR FOUNDRIES.

RULE 49. No foundry shall hereafter be located in a cellar unless the ceiling shall be at least fourteen (14) feet in height measured from the surface of the finished floor to the under side of the ceiling; and if the foundry is located or intended to be located in the front part of the building, unless the ceiling of the foundry shall be in every part at least six (6) feet, six (6) inches above the curb level of the street in front of the building; or, if the foundry is located or intended to be located in the rear part of the building, or to extend from the front to the rear, unless the ceiling shall be not less than three (3) feet above the curb level of the street in front of the building, and the foundry shall open on a yard or court which shall extend at least six (6) inches below its floor level; nor unless proper and adequate provision shall be made for lighting and heating.

EXISTING CELLAR FOUNDRIES.

RULE 50. In case any foundry that was legally operated in a cellar or basement on January 1st, 1916, shall be discontinued or unused for a period of more than four (4) consecutive months, it can thereafter be reopened as a foundry only by complying with the provisions of the rules relating to future foundries.

The occasional operation of a foundry for the purpose of evading this rule shall not be deemed a continuance of use thereof.

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**END OF
TITLE**